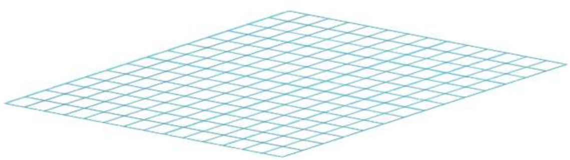
Code specs | RK4 Integrator

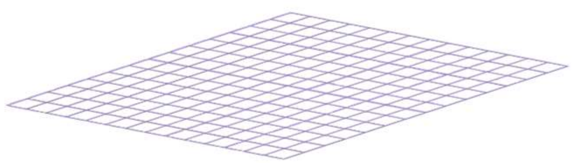
A more optimal implementation: $4N^3$



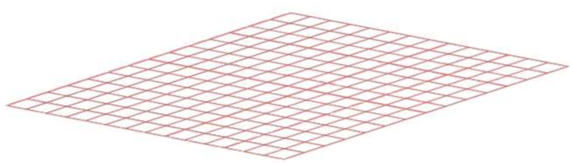
y_n

$$y_x = 0$$

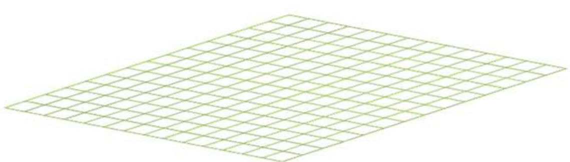
$$y_{k_1} = y_n + \frac{h}{2} f(t_n, y_n) \qquad y_x \mathrel{+}= y_{k_1}$$



$$y_{k_2} = y_n + \frac{h}{2} f\left(t_n + \frac{h}{2}, y_{k_1}\right) \qquad y_x \mathrel{+}= 2y_{k_2}$$



$$y_{k_3} = y_n + h f\left(t_n + \frac{h}{2}, y_{k_2}\right) \qquad y_x \mathrel{+}= y_{k_3}$$

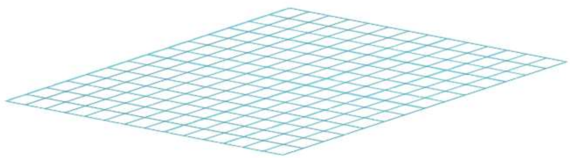


$$y_{n+1} = \frac{1}{3}(y_x - y_n) + \frac{1}{6} h f\left(t_n + h, y_{k_3}\right)$$

Code specs | RK4 Integrator

Given a starting y_p, compute internally or externally

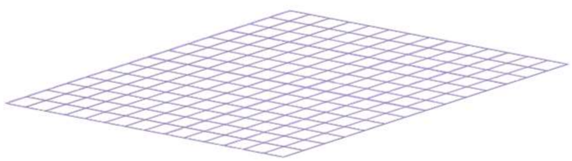
$y_a = y_p,\ y_f = 0$



$y_c = f(y_a)$

$y_c = y_p + \frac{h}{2} y_c;\quad y_f \mathrel{+}= y_c$

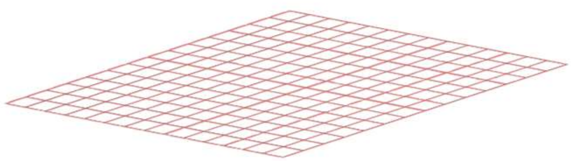
$y_c \leftrightarrow y_a$



$y_c = f(y_a)$

$y_c = y_p + \frac{h}{2} y_c;\quad y_f \mathrel{+}= 2y_c$

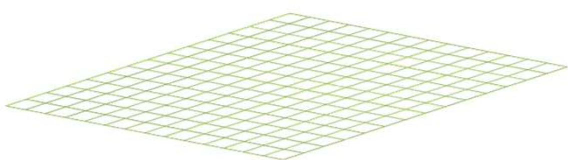
$y_c \leftrightarrow y_a$



$y_c = f(y_a)$

$y_c = y_p + h y_c;\quad y_f \mathrel{+}= y_c$

$y_c \leftrightarrow y_a$



$y_c = f(y_a)$

$y_f = y_p = \frac{1}{3}(y_f - y_p) + \frac{1}{6} h y_c$